Introduction
The state-mandated school closures through the end of the 2019-2020 school year not only changed the way schools delivered instruction but impacted how students were expected to learn grade level and course content. As districts prepare for the 2020-2021 school year, the Department is providing a series of Student Readiness Toolkits to help educators reflect on their instructional practices and support them in determining where their students are in their acquisition and retention of knowledge and skills.

Background
The items contained in the Student Readiness Toolkits have been selected from the pool of released items from previous spring administrations of the Ohio State Tests. The items are grouped together by Reporting Category and Critical Area of Focus. The collection of items as a whole is not representative of a single test form. The items presented are selected to offer a range of opportunity to work with each reporting category, but do not comprise an actual test statistically. They are chosen to offer a range of experience with items of varying levels of difficulty or complexity. Items contained in the Student Readiness Toolkits are reflective of the 2017 Ohio Learning Standards for Mathematics. All items satisfy the criteria set forth by the grade level/course Test Specifications and the Content Elaborations and Expectations for Learning established by the grade level/course Model Curriculum.

How These Items Can Be Used
The Student Readiness Toolkits documents can be used to support instruction in a variety of ways. Districts can choose to administer the:

- Previous grade level Student Readiness Toolkits items to acquire data and gather information on student understanding of previous grade level content to begin the new school year;
- Current grade level Student Readiness Toolkits items in sections as instructional unit of study pre-assessments based on the grade level/course Critical Areas of Focus or local unit of study;
- Current grade level Student Readiness Toolkits items in its entirety;
- Problems may be individually selected for use during local instruction; or
- Problems may be selected for use on local assessments.

How to Identify Released Items
At the bottom of the page for each released item there is a page number and a year. For example: 3 (2018), identifies the item can be found on page 3 of the 2018 Released Item document for the grade level or course. Released Item Scoring Guides for Mathematics are available in the Test Portal in the Student Practice Resources for Mathematics folder under the Student Practice Resources.

The Released Item Release Scoring Guides sample responses and scoring rationales that can help educators plan and deliver instruction by providing example responses for each question along with scoring rationales for each response.

- 2017 Item Release Scoring Guide Grade 4
- 2018 Item Release Scoring Guide Grade 4
- 2019 Item Release Scoring Guide Grade 4
Using Released Test Items to Plan Instruction after COVID-19

The following questions can be answered individually or as a teacher team in the review of the state released items and subsequent reflection on the local curriculum, instructional practices, and assessments (both formative and summative) along with the previous learning opportunities for students.

- What are the math concepts evident in the release item(s)?
  - What is the math a student needs to know in this item?
  - Specifically, what previous grade level standards impact the ability to answer this item?

- What math strategies can a student use to answer the item?
  - Identify examples of how these can be included in your instruction.

- Does the item focus on procedural fluency or conceptual understanding?
  - Procedural Fluency follow-up:
    - What are the procedures and/or skills a student needs to know?
    - What experiences do students have to be prepared to demonstrate this learning?
    - What experiences can be used to move toward the desired outcome(s)?

- Conceptual Understanding follow-up:
  - What mathematical understanding is evident in the item?
  - What tasks can be used to develop that mathematical understanding?

- Does the item require the student to make connections across standards? If so, what are they?
  - What previous grade level expectations are evident in the item?
  - What experiences can improve the students’ ability to demonstrate these learning expectations?

- Which Standards for Mathematical Practice are most evident in the item?
  - What types of experiences will improve student success?
Preparing for Instruction

Identify a grade level Critical Area of Focus, a mathematical topic of related standards, think about what your typical instruction for this critical area of focus looks like, then determine the changes likely needed to grow all students mathematically.

- What was present in past instruction that helped students perform well?
  - Using the Gap Analysis, Critical Area of Focus, Learning Progressions, and Model Curriculum documents, what previous learning is likely absent or weak?
  - What experiences would support bridging the gap(s)?
  - How could you strengthen the Standards for Mathematical Practice to help support/enhance learning?
  - Specifically, what tasks would be used?

- What does typical instruction include?
  - Models/Representations? What models/representations need introduction?
  - 1-step, 2-step, or Multi-step problems? Is more experience needed? What?
  - Routine and Non-routine problems? Is more experience needed? What?
  - Mathematical and Real-world contexts? Is more experience needed? What rich tasks could incorporate multiple standards?

- Did the mathematical contexts use numbers and operations appropriate for the grade level?
  - How could those numbers be modified to highlight the mathematical understanding needed and increase access for all students?

- Were the real-world contexts familiar or unfamiliar to the students?
  - How do you know?
  - What is needed now?

- Did the instruction allow opportunities for student reasoning and communication?
  - Productive struggle?
  - Student analysis of individual work, thinking and reasoning of others?
  - Descriptions, explanations and justifications?
  - Error analysis and reasonableness of answers?
  - What changes are needed to strengthen the Standards for Mathematical Practice?

- From this analysis, what overall changes are needed in instruction?
  - What instructional strategies should be maintained?
  - What instructional strategies require modification?
  - What needs to happen next to increase learning for all students?
    - Resources
    - Instructional Strategies
    - Professional Development
      - Do I need to seek out professional learning opportunities? What opportunities do I have for growing my own learning? What supports do I have to make these changes?
Grade 4
Reporting Category:

Multiplication and Division

CRITICAL AREA OF FOCUS #1
Developing an understanding and fluency with multi-digit multiplication and developing understanding of dividing to find quotients involving multi-digit dividends as part of effectively and efficiently performing multi-digit arithmetic.
Question 17

An equation is shown.

40 = 5 \times 8

Which statement can be used to represent the equation?

A 40 is 5 more than 8.
B 8 more than 5 is 40.
C 40 is 8 times as many as 5.
D 8 is 5 times as many as 40.

Points Possible: 1

Content Cluster: Use the four operations with whole numbers to solve problems.

Content Standard: Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 \times 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4.OA.1)

Depth of Knowledge: Level 2
j. Translate between tables, graphs, words and symbolic notation
Question 14

A red shirt costs 3 times as much as a black shirt. If a black shirt costs $9, how much does a red shirt cost?

Select the two statements that can be used to represent the problem.

☐ 3 times 9 is 27.
☐ 3 times 27 is 9.
☐ 9 times 3 is 27.
☐ 9 times 27 is 3.
☐ 27 times 3 is 9.
☐ 27 times 9 is 3.

Points Possible: 1

Content Strand: Use the four operations with whole numbers to solve problems.

Content Standard: Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4.OA.1)
Question 29

A baker makes 30 cupcakes. He makes 3 times as many cupcakes as his friend Sarah.

How many cupcakes does Sarah make?

A 10
B 27
C 33
D 90

Points Possible: 1

Content Cluster: Use the four operations with whole numbers to solve problems.

Content Standard: Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. (4.OA.2)
Question 9

Ms. Miller has 4 packs of pencils with 10 pencils in each pack. There are 32 students in Ms. Miller’s class. She gives each student 1 pencil.

How many pencils does Ms. Miller have left over? Enter the number in the box.

Points Possible: 1

Content Cluster: Use the four operations with whole numbers to solve problems.

Content Standard: Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4.OA.3)
Question 15

A teacher spends $100 on posters for his classroom. The price for each size of poster is shown in the table.

Complete the table to show how many posters of each size the teacher could have bought.

<table>
<thead>
<tr>
<th>Poster Size</th>
<th>Price</th>
<th>Number of Posters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>$7</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>$11</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>$13</td>
<td></td>
</tr>
</tbody>
</table>

Points Possible: 1

Content Cluster: Use the four operations with whole numbers to solve problems.

Content Standard: Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4.OA.3)
**Question 40**

Destini and Myles are playing a video game. Myles has 125 points. Destini has 9 times as many points as Myles.

How many points do they have altogether?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>139</td>
</tr>
<tr>
<td>B</td>
<td>259</td>
</tr>
<tr>
<td>C</td>
<td>1125</td>
</tr>
<tr>
<td>D</td>
<td>1250</td>
</tr>
</tbody>
</table>

**Points Possible:** 1

**Content Cluster:** Use the four operations with whole numbers to solve problems.

**Content Standard:** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4.OA.3)

**Depth of Knowledge:** Level 2

d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts
**Question 8**

Eliza writes a number.
- The number is between 20 and 30.
- It has exactly 4 factors.
- One of the factors is 7.

What is Eliza’s number?

A 21
B 26
C 28
D 35

**Points Possible:** 1

**Content Cluster:** Gain familiarity with factors and multiples.

**Content Standard:** Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite. (4.OA.4)

**Depth of Knowledge:** Level 2
  d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts
  l. Select a procedure according to criteria and perform it
Question 44

Select the four numbers that are factors of 84.

☐ 4
☐ 5
☐ 6
☐ 9
☐ 14
☐ 21

Points Possible: 1

Content Cluster: Gain familiarity with factors and multiples.

Content Standard: Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. (4.OA.4)
Question 33

Four numbers in a number pattern are shown in the table. The pattern continues in the same way. Complete the table to show the missing numbers in the number pattern.

255, [ ] , [ ] , 210, [ ] , 180, 165, ...

Points Possible: 1

Content Cluster: Generate and analyze patterns.

Content Standard: Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule Add 3 and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way. (4.OA.5)

Depth of Knowledge: Level 3
e. Use concepts to solve non-routine problems
f. Perform a procedure with multiple steps and multiple decision points
Question 39

A teacher wrote the number 380,000. A student wrote the number 38,000.

How many times larger is the 8 in the teacher’s number than the 8 in the student’s number? Enter the number in the box.

Points Possible: 1

Content Cluster: Generalize place value understanding for multi-digit whole numbers less than or equal to 1,000,000.

Content Standard: Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right by applying concepts of place value, multiplication, or division. (4.NBT.1)

Depth of Knowledge: Level 1
a. Recall, observe, or recognize a fact, definition, term, or property
Question 39

Enter the value “two hundred five thousand, three hundred fifty” in the box.

Points Possible: 1

Content Cluster: Generalize place value understanding for multi-digit whole numbers.

Content Standard: Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. (4.NBT.2)
Question 16

Select the two correct representations of the number “one thousand, twenty five.”

☐ 1,000 + 20 + 5
☐ 1,000 × 20 × 5
☐ 1,000 + 200 + 5
☐ 1,025
☐ 1,205
☐ 1,250

Points Possible: 1

Content Strand: Generalize place value understanding for multi-digit whole numbers.

Content Standard: Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. (4.NBT.2)
Question 7

Points Possible: 1

Content Cluster: Generalize place value understanding for multi-digit whole numbers.

Content Standard: Use place value understanding to round multi-digit whole numbers to any place. (4.NBT.3)
**Question 45**

An expression is given.

2344 + 835

What is the value of the expression? Enter the number in the box.

[Input Field]

Points Possible: 1

**Content Cluster:** Use place value understanding and properties of operations to perform multi-digit arithmetic with whole numbers less than or equal to 1,000,000.

**Content Standard:** Fluently add and subtract multi-digit whole numbers using a standard algorithm. (4.NBT.4)

**Depth of Knowledge:** Level 1
b. Apply/compute a well-known algorithm (e.g., sum, quotient)
Question 16

What is the difference between 34,162 and 12,531? Enter the number in the box.

Points Possible: 1

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

Content Standard: Fluently add and subtract multi-digit whole numbers using the standard algorithm. (4.NBT.4)
Question 34

Place models in the blank box to represent the product of 156 and 2.

- There may be more than one way to show a correct answer.

Points Possible: 1

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

Content Standard: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.5)
Question 4

What is the product of 24 and 13? Enter the number in the box.

Points Possible: 1

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

Content Standard: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.5)
Question 18

Ms. Thompson sets up chairs in rows for a school concert.

- She uses 328 chairs.
- She sets up at least 2 rows of chairs but not more than 10 rows of chairs.
- Each row has an equal number of chairs.

A. How many rows of chairs does Ms. Thompson set up? Enter the number in the first box.

B. How many chairs are in each row? Enter the number in the second box.

A. 

B. 

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Points Possible: 1

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic with whole numbers less than or equal to 1,000,000.

Content Standard: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.6)

Depth of Knowledge: Level 3
e. Use concepts to solve non-routine problems
f. Perform a procedure with multiple steps and multiple decision points
Question 12

A worker has 32 screwdrivers to put into tool kits.

A. How many tool kits can the worker make if he puts 6 screwdrivers into each tool kit? Enter the number in the first box.

B. How many screwdrivers will be left over after the worker makes the tool kits? Enter the number in the second box.

A. ___________________________
B. ___________________________

Points Possible: 2

Content Cluster: Use place value understanding and properties of operations to perform multi-digit arithmetic.

Content Standard: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. (4.NBT.6)
Question 32

A student creates a rectangular garden for 24 tomato plants. Each tomato plant has 1 square foot of space and there is no additional space in the garden.

Select the three rectangles that could represent the garden.

Points Possible: 1

Content Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

Content Standard: Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. (4.MD.3)
Grade 4
Reporting Category:

Fractions

CRITICAL AREA OF FOCUS #2
Developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers.
Question 16

Create a fraction that is equivalent to $\frac{2}{3}$.

- Place a number in each box to make a fraction equivalent to $\frac{2}{3}$.
- There may be more than one correct answer.

Points Possible: 1

Content Cluster: Extend understanding of fraction equivalence and ordering limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

Content Standard: Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(n \times a)}{(n \times b)}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (4.NF.1)

Depth of Knowledge: Level 2
h. Extend a pattern
Question 10

Models of two equivalent fractions are shown.

Fraction 1

Fraction 2

Which statement describes how Fraction 2 can be created from Fraction 1?

A. Add 3 to the numerator only.
B. Multiply only the numerator by 3.
C. Add 3 to the numerator, and add 3 to the denominator.
D. Multiply the numerator by 3, and multiply the denominator by 3.

Points Possible: 1

Content Cluster: Extend understanding of fraction equivalence and ordering.

Content Standard: Explain why a fraction \( \frac{a}{b} \) is equivalent to a fraction \( \frac{n \times a}{n \times b} \) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (4.NF.1)
Question 18

Select the boxes to show whether each fraction is less than, equal to, or greater than $\frac{3}{4}$.

<table>
<thead>
<tr>
<th>Less Than $\frac{3}{4}$</th>
<th>Equal to $\frac{3}{4}$</th>
<th>Greater Than $\frac{3}{4}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{6}{10}$</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>$\frac{4}{5}$</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>$\frac{9}{12}$</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Points Possible: 1

Content Cluster: Extend understanding of fraction equivalence and ordering.

Content Standard: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. (4.NF.2)
Question 41

The denominator of a fraction is doubled and the numerator stays the same. What is the effect on the value of the fraction?

A) The value of the fraction is doubled.
B) The value of the fraction is halved.
C) The value of the fraction increases by 2.
D) The value of the fraction increases by $\frac{1}{2}$.

Points Possible: 1

Content Cluster: Extend understanding of fraction equivalence and ordering limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

Content Standard: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. (4.NF.2)

Depth of Knowledge: Level 3

g. Generalize a pattern
Question 3

Two fractions and two unshaded fraction models are shown.

A. Select the comparison symbol that correctly compares the two fractions.
B. Select sections of each fraction model to represent the comparison.

Points Possible: 2

Content Cluster: Extend understanding of fraction equivalence and ordering.

Content Standard: Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as \(\frac{1}{2}\). Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (4.NF.2)
Question 30

Eric and Nancy both baked muffins. They each filled a pan of the same size. Eric ate $\frac{4}{6}$ of his muffins and Nancy ate $\frac{3}{6}$ of her muffins. The diagram shows how many muffins they each have left.

What is the difference between the fraction of muffins Eric ate and the fraction of muffins Nancy ate? Enter the number in the box.

Points Possible: 1

Content Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Content Standard: Understand a fraction $a/b$ with $a > 1$ as a sum of fractions $1/b$. (4.NF.3)

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
Question 48

An expression is given.

\[1 \frac{2}{6} + 2 \frac{5}{6}\]

What is the value of the expression? Enter the number in the box.

[Input box with numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 0.]

Points Possible: 1

Content Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Content Standard: Understand a fraction \(a/b\) with \(a > 1\) as a sum of fractions \(1/b\). (4.NF.3)

c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
Question 34

Select the two expressions that have a sum of $\frac{7}{10}$

☐ $\frac{5}{5} + \frac{2}{5}$

☐ $\frac{10}{10} + \frac{3}{10}$

☐ $\frac{3}{10} + \frac{4}{10}$

☐ $\frac{2}{10} + \frac{2}{10} + \frac{2}{10} + \frac{1}{10}$

☐ $\frac{2}{2} + \frac{2}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$

Points Possible: 1

Content Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. (Fractions need not be simplified.)

Content Standard: Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.

Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2 \frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$.

(4.NF.3b)

Depth of Knowledge: Level 2
d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts
e. Compare and/or contrast figures or statements
Question 37

Jenna plans to place 16 plates of ham and cheese on tables at a picnic. She estimates that each plate will have $\frac{5}{8}$ pound of ham and $\frac{1}{8}$ pound of cheese.

Based on Jenna’s estimate, how many pounds of ham and how many pounds of cheese does Jenna need? Enter a number in each box.

\[\text{pounds of ham} \quad \text{pounds of cheese}\]

\[
\begin{array}{ccc}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9 \\
0 & . & 10
\end{array}
\]
Points Possible: 2

Content Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100. (Fractions need not be simplified.)

Content Standard: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat $\frac{3}{8}$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie? (4.NF.4c)

Depth of Knowledge: Level 2
d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts
Question 5

Which sum shows one way to express $1 \frac{5}{6}$?

A. $\frac{1}{6} + \frac{2}{6} + \frac{2}{6}$

B. $\frac{1}{6} + \frac{5}{6} + \frac{6}{6}$

C. $\frac{2}{6} + \frac{4}{6} + \frac{5}{6}$

D. $\frac{5}{6} + \frac{5}{6} + \frac{5}{6}$

Points Possible: 1

Content Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Content Standard: Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{1}{8} + \frac{2}{8}$. $2\frac{1}{8} = 1 + \frac{1}{8} = \frac{8}{8} + \frac{1}{8}$. (4.NF.3b)
Question 1

An expression is shown.

$$12 \times \frac{3}{100}$$

What is the value of the expression? Enter the number in the box.

Points Possible: 1

Content Cluster: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Content Standard: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

b. Understand a multiple of \(\frac{a}{b}\) as a multiple of \(\frac{1}{b}\) and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express

$$3 \times \left(\frac{2}{5}\right)$$

as $$6 \times \left(\frac{1}{5}\right)$$, recognizing this product as $$\frac{6}{5}$$. (In general, $$n \times \left(\frac{a}{b}\right) = \left(\frac{n \times a}{b}\right)$$.) (4.NF.4b)
Question 26

A fraction is shown.

\[ \frac{4}{10} \]

A. Select boxes on the hundreds grid to model a fraction equivalent to \( \frac{4}{10} \).

B. Place numbers in the blank boxes to make the equation true.

- Use only one number in each blank box you fill in.
Points Possible: 1

Content Cluster: Understand decimal notation for fractions, and compare decimal fractions.

Content Standard: Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$. (4.NF.5)
Question 21

An equation that uses fraction models is shown.

\[ \frac{23}{100} + ? = \]

Which fraction makes the equation true?

A  \[ \frac{23}{100} \]
B  \[ \frac{23}{90} \]
C  \[ \frac{50}{100} \]
D  \[ \frac{50}{90} \]

Points Possible: 1

Content Cluster: Understand decimal notation for fractions, and compare decimal fractions limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

Content Standard: Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express \( \frac{3}{10} \) as \( \frac{30}{100} \), and add \( \frac{3}{10} + \frac{4}{100} = \frac{34}{100} \). In general, students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators, but addition and subtraction with unlike denominators is not a requirement at this grade. (4.NF.5)

Depth of Knowledge: Level 2

c. Use models to represent mathematical concepts
d. Solve a routine problem requiring multiple steps/decision points, or the application of multiple concepts
Question 46

A fraction is given.
\[
\frac{13}{100}
\]

Which decimal is equal to the given fraction?

(A) 0.0013

(B) 0.013

(C) 0.13

(D) 1.3

Points Possible: 1

Content Cluster: Understand decimal notation for fractions, and compare decimal fractions limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

Content Standard: Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as \(\frac{62}{100}\); describe a length as 0.62 meters; locate 0.62 on a number line diagram. (4.NF.6)

Depth of Knowledge: Level 1

k. Recall, identify, or make conversions between and among representations or numbers (fractions, decimals, and percents), or within and between customary and metric measures.
Question 15

Natalie and Wyatt are hiking. Natalie hikes for 1.5 miles and Wyatt hikes for 1.3 miles.

A. Select a mark on each number line to show the distances, in miles, that Natalie and Wyatt hike.

B. Select the symbol that completes the comparison for Natalie’s and Wyatt’s hikes.

Points Possible: 2

Content Cluster: Understand decimal notation for fractions, and compare decimal fractions.

Content Standard: Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model. (4.NF.7)
Question 24

Two numbers are being compared as shown.

0.8 < □

Which value makes this comparison true?

A  0.08
B  0.09
C  0.8
D  0.9

Points Possible: 1

Content Cluster: Understand decimal notation for fractions and compare decimal fractions.

Content Standard: Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model. (4.NF.7)
Question 24

A teacher measures how far some students in his class can jump. His data are shown in the line plot.

How many students jumped less than 4 feet?

- **A** 2
- **B** 3
- **C** 4
- **D** 8

Points Possible: 1

**Content Cluster:** Represent and interpret data.

**Content Standard:** Display and interpret data in graphs (picture graphs, bar graphs, and line plots) to solve problems using numbers and operations for this grade. (4.MD.4)

**Depth of Knowledge:** Level 1

j. Retrieve information from a table or graph
CRITICAL AREA OF FOCUS #3
Understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, and particular angle measures.
Question 37

Use the Connect Line tool to create a quadrilateral with only one set of parallel sides.

- There may be more than one correct answer.
Points Possible: 1

Content Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Content Standard: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4.G.1)
# Question 2

Select the name that describes each angle.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>acute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>obtuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>right</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Points Possible:** 1

**Content Cluster:** Draw and identify lines and angles and classify shapes by properties of their lines and angles.

**Content Standard:** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4.G.1)

**Depth of Knowledge:** Level 1

n. Represent math relationships in words, pictures, or symbols
Question 31

Two groups of figures are shown.

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Figure 1" /></td>
<td><img src="image2.png" alt="Figure 2" /></td>
</tr>
</tbody>
</table>

Which property was used to sort the figures into the two groups?

A. acute angles
B. obtuse angles
C. parallel sides
D. perpendicular sides

Points Possible: 1

Content Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Content Standard: Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles. (4.G.2)
Question 10

Select the three polygons that have at least one set of parallel sides.

Points Possible: 1

Content Cluster: Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Content Standard: Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. (4.G.2)

Depth of Knowledge: Level 2
e. Compare and/or contrast figures or statements
Question 27

A student ran 9 kilometers (km).

How many meters (m) did she run? Enter the number in the box.

Points Possible: 1

Content Cluster: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

Content Standard: Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ... (4.MD.1)
Question 11

In the circle diagram shown, point Y is at the center of the circle.

What is the measure, in degrees, of angle XYZ? Enter the number in the box.

Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of angle and measure angles.

Content Standard: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

b. An angle that turns through $n$ one-degree angles is said to have an angle measure of $n$ degrees. (4.MD.5b)
Question 12

An angle is shown.

What is the measure of the angle, in degrees? Enter the number in the box.

Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of angle and measure angles.

Content Standard: Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. (4.MD.6)
Question 11

One ray of angle R is shown.

Use the Add Arrow tool to complete angle R so that it measures 135°.

Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of angle and measure angles.

Content Standard: Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. (4.MD.6)

Depth of Knowledge: Level 2
c. Use models to represent mathematical concepts
Question 8

Angle ABC is made up of three smaller angles, as shown. The measure of angle ABC is 140°.

What is the measure, in degrees, of angle DBE? Enter the number in the box.

[Diagram showing angle DBE with known angles 45° and 25°]

Points Possible: 1

**Content Cluster:** Geometric measurement: understand concepts of angle and measure angles.

**Content Standard:** Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. (4.MD.7)
Question 6

A diagram is shown.

What is the measure, in degrees, of the missing angle? Enter the number in the box.

degrees

1  2  3
4  5  6
7  8  9
0  .  

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Points Possible: 1

Content Cluster: Geometric measurement: understand concepts of angle and measure angles.

Content Standard: Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. (4.MD.7)

Depth of Knowledge: Level 2
i. Retrieve information from a table, graph, or figure and use it solve a problem requiring multiple steps